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## TORREYA

June, 1903

## NOTES ON NEW MEXICO OAKS

BY T. D. A. COCKERELL

IN TORREYA, January, 1903, I recorded seven named forms of *Quercus* from Las Vegas Hot Springs. The material obtained agreed well with published accounts, and especially with the excellent figures given by Dr. Rydberg in Bull. N. Y. Bot. Gard., May, 1901. Whatever might be the value of these plants as species, it was evident that there were "points of relative stability" which were easily recognizable. On May 17, 1903, I visited all these oaks again, returning to the exact bushes whence I had my material of the year before. The new information thus obtained, together with the results of various observations at other times, lead me to some conclusions which seem worth recording.

The sides of Gallinas Cañon at Las Vegas Hot Springs slope towards the northeast and southwest. The slope facing southwest is more exposed to the winds than the other, but it also gets considerably more sun, and is dry and warm when the ground on the other side is still frozen. Here one would expect to see the oaks first leafing out, but the oak scrub on May 17 looked lifeless, without green, from a distance. On closer inspection some patches of green (*Q. Fendleri*) were seen at the lower levels, and it was observed that the other plants (*Q. undulata*, *Q. Rydbergiana* and *Q. grisea*) were leafing out, but the early leaves were inconspicuous because reddish. The opposite and colder slope, very differently, was largely covered with light green oak foliage, which proved to be *Q. Gambelii* and *Q. nites-*

[Vol. 3, No. 5, of TORREYA, comprising pages 67-82, was issued May 12, 1903.]

*cens*, with some *Q. Fendleri*. At the lower levels *Q. Rydbergiana* and *Q. grisea* were also present. Of course the explanation of this distribution is found in the fact that the oaks of the *Gambelii* series belong to a colder climate and ordinarily to a higher altitude than those allied to *undulata*. On May 17 *Q. nitescens* and *Q. Gambelii* were practically over flowering, and *Q. Novomexicana* was coming into flower; while the *undulata* series (*i. e.*, all the other species) were in bud or little more advanced. I will now consider the species somewhat more in detail:

#### (A.) *Gambelii* SERIES

In the early leaf, the three forms are easily separated thus:

Lobes of leaf not at all bifid; general color light green with little red. *Q. Gambelii*.  
Lobes of leaf (except towards base) bifid.

Young leaves very light green, narrower, deeply incised, hanging down.

*Q. Novomexicana*.

Young leaves not so light, broader, not so deeply incised, not so pendulous.

*Q. nitescens*.

*Q. nitescens* has the young shoots dark red, and the midribs of the leaves usually reddish, but the leaves glossy light green. *Q. Novomexicana* has the midribs green; the young leaves are quite grayish compared with the other two forms. *Q. Gambelii* has narrow pendulous leaves, but is easily distinguished from *Q. Novomexicana* by the characters already given. Altogether, the new evidence tends to substantiate the validity of these three species, about which I previously felt doubtful. Dr. Rydberg says the leaves of *Q. Novomexicana* are bright red when they unfold, but I am sure this could not have been the case with the plants I studied. I am strongly convinced that the pigmentation of oak-leaves varies to a great extent independently of the other characters, as DeVries so often found with the pigmentation of flowers.\* Under these circumstances, the name must go with the leaf-form rather than with leaf-color.

#### (B.) *Undulata* SERIES.

*Quercus undulata* Torr. Leaves still very small, but as in all of this series except *Q. Fendleri*, some leaves of last year

\* Cf. his statement: "The units of the specific characters are to be regarded and studied as sharply separated quantities." (Jour. Roy. Hort. Soc. 25: 243. 1901.)

still remained on the bushes, permitting certain identification. The color of the young leaves is pinkish-green, varying to dark reddish and light grayish, each bush being uniform or almost so. At one place clumps of the dark reddish and light grayish forms were growing close together, and close to them was a light green clump of *Q. Fendleri*, all three strongly contrasting. Dr. Rydberg speaks of the early leaves of *Q. Fendleri* as gray, but I did not find them so, though certain grayish forms referred to *Q. undulata* showed some approach to *Q. Fendleri*.

*Quercus Fendleri* Liebm. The light green leaves (the youngest sometimes pinkish) were usually better developed than those of other members of the series. If it were not so very common, one could imagine *Q. Fendleri* a hybrid between *Q. undulata* and *Q. Gambelii*.\*

*Quercus Emoryi* Torr. The single clump which I referred to this species grows in front of the bath-house, and it certainly has relatively large leaves which agree with Rydberg's figure; it is also in stature more like *Q. Gambelii* than *Q. undulata*, etc. However, the genuine *Q. undulata* throws up vigorous shoots from the roots, which bear dark red, large leaves just like those of the supposed *Q. Emoryi*. My present impression is that the Hot Springs plant is really a form derived from *Q. undulata*, on the spot, and not genetically connected with *Q. Emoryi* of the south, though the latter probably had a similar origin. The leaves of my plant are full of small lenticular galls, not observed in the other forms. This refers of course to the leaves of last year; those of this year are pink, and only just out of bud. The clump, with its lifeless appearance, contrasts curiously with a lively green clump of *Q. Gambelii* close by.

*Quercus grisea* Liebm. This grows larger than most *Q. undulata*, and is late in coming out. The young leaves are pink. The form of the mature leaves varies from that of *Q. undulata* to that of *Q. grisea* on the same bush, though many bushes have all the leaves unmistakably *grisea*. I am decidedly of the opinion that *Q. grisea* is only a subspecies of *Q. undulata*.

\* The known localities of *Q. Fendleri* are apparently those in which this might be possible, with the exception of Canadian River, Texas, where *Q. Gambelii* could hardly occur.

*Quercus Rydbergiana* Cockerell. The leaves are somewhat more advanced than those of *Q. grisea*; their color is always pink. After considerable study, I think this plant is (like *Q. grisea*) best regarded as a subspecies of *Q. undulata*, namely ***Quercus undulata Rydbergiana***, notwithstanding differences in the leaves and fruit. All things considered, I do not feel perfectly assured that there is more than one valid species of the *undulata* group at Las Vegas Hot Springs, but since five easily recognizable types are undoubtedly present, it is proper that they should have names of some sort.

EAST LAS VEGAS, N. M.

## A KEY TO THE NORTH AMERICAN SPECIES OF PANUS

BY F. S. EARLE

- |   |                                 |
|---|---------------------------------|
| 1. Stipe excentric; pileus irregular.                         | 2.                              |
| Stipe lateral.  | 14.                             |
| Stipe wanting; pileus sessile or resupinate.                  | 20.                             |
| 2. Pileus squamulose, strigose or velutinous.                 | 3.                              |
| Pileus glabrous.  | 7.                              |
| 3. Pileus white.  | 4.                              |
| Pileus colored.   | 6.                              |
| 4. Pileus infundibuliform, slightly velvety.                  | <i>P. Infundibulum</i> B. & C.* |
| Pileus somewhat depressed, villous or strigose.               | 5.                              |
| 5. Pileus 7-8 cm., villous, whitish.                          | <i>P. levis</i> B. & C.         |
| Pileus 20 cm., strigose, whitish.                             | <i>P. strigosus</i> B. & C.     |
| 6. Pileus cinnamon, becoming expellent, breaking into scales. | <i>P. conchatus</i> Fr.         |
| Pileus alutaceous, densely floccose-appressed, scaly.         | <i>P. troglodytes</i> Fr.*      |
| 7. Cespitose.   | 8.                              |
| Not cespitose.  | 11.                             |
| 8. Stipe tomentose.   | <i>P. connatus</i> Berk.*       |
| Stipe glabrous.   | 9.                              |
| 9. Lamellae free; pileus brown.                               | <i>P. Sullivantii</i> Mont.     |
| Lamellae decurrent or subdecurrent.                           | 10.                             |
| 10. Pileus infundibuliform.                                   | <i>P. concavus</i> Berk.*       |
| Pileus expanded-umbonate, yellow.                             | <i>P. illudens</i> (Schw.) Fr.  |
| 11. Pileus convex to expanded.                                | 12.                             |
| Pileus becoming umbilicate or infundibuliform.                | 13.                             |
| 12. Stipe glabrous.   | <i>P. Robinsonii</i> B. & Mont. |
| Stipe fibrillose-striate.                                     | <i>P. Cubensis</i> B. & C.*     |

\* Known from tropical America only.